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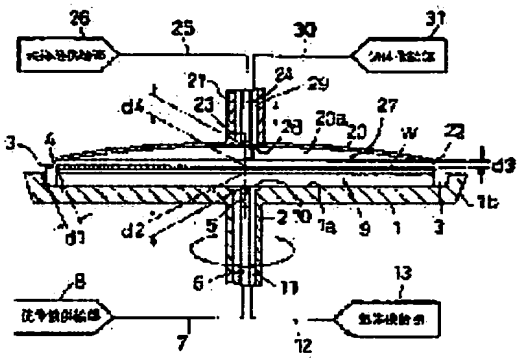
(54) SUBSTRATE TREATING EQUIPMENT

(57)Abstract:
PROBLEM TO BE SOLVED: To reduce the quantity of use of gas supplied to the space on the blocking member side and alleviate contamination of the surface of a substrate on the blocking member side.
SOLUTION: The substrate treating equipment comprises a substrate holding means that holds a substrate W and spins it on a specified axis; a blocking member 20 that has a face 20a opposed to a held substrate W; and a blocking member-side gas supplying means that supplies gas to the blocking member-side space 27 between the face of a held substrate W on the blocking member 20 side and the opposed face 20a of the blocking member 20. The length d3 of the gap 22 between the peripheral end of a held substrate W and the blocking means 20 is made smaller than the distance d4 between the vicinity of the central portion of a held substrate W on the blocking member 20 side and the face 20a of the blocking member 20 facing opposite to the portion.



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CLAIMS

[Claim(s)]
[Claim 1] A substrate maintenance means to hold a substrate and to rotate the held substrate to the circumference of a predetermined shaft, The substrate held at said substrate maintenance means, and the cutoff member which has the opposed face which counters, A cutoff member side gas supply means to supply a gas to the space between the field by the side of the cutoff member of the substrate held at said substrate maintenance means, and the opposed face of said cutoff member from near the core of the opposed face of said cutoff member, Spacing of the clearance between the periphery edge of the substrate held at the preparation and said substrate maintenance means, and said cutoff member The substrate processor characterized by constituting so that it may be made narrower than spacing of near the center section of the field by the side of said cutoff member of the substrate held at said substrate maintenance means, and the opposed face of said cutoff member which counters the part.
[Claim 2] A substrate maintenance means to hold a substrate and to rotate the held substrate to the circumference of a predetermined shaft, The substrate held at said substrate maintenance means, and the cutoff member which has the opposed face which counters, A cutoff member side gas supply means to supply a gas to the space between the field by the side of the cutoff member of the substrate held at said substrate maintenance means, and the opposed face of said cutoff member from near the core of the opposed face of said cutoff member, The substrate processor characterized by having the cutoff member side resistance member which bars the flow of the gas which flows out of the clearance between the periphery edge of the substrate which was formed in the periphery section of said cutoff member, or its near, and was held at said substrate maintenance means, and said cutoff member.
[Claim 3] The spin base which rotates said substrate maintenance means to the circumference of a predetermined shaft in a substrate processor according to claim 1 or 2, and has a substrate and the opposed face which counters, The substrate attachment component which separates from the opposed face of said spin base, and holds a substrate, To the space between the field by the side of the spin base of the substrate which carried out preparation ****** and was held at said substrate attachment component, and the opposed face of said spin base It has further a spin base side gas supply means to supply a gas from near the center-of-rotation section of the opposed face of said spin base. Spacing of the clearance between the periphery edge of the substrate held at said substrate attachment component, and said spin base The substrate processor characterized by constituting so that it may be made narrower than spacing of near the center section of the field by the side of said spin base of the substrate held at said substrate attachment component, and the opposed face of said spin base which counters the part.
[Claim 4] The spin base which rotates said substrate maintenance means to the circumference of a predetermined shaft in a substrate processor according to claim 1 or 2, and has a substrate and the opposed face which counters, The substrate attachment component which separates from the opposed face of said spin base, and holds a substrate, A spin base side gas supply means to supply a gas to the space between the field by the side of the spin base of the substrate which carried out preparation ****** and was held at said substrate attachment component, and the opposed face of said spin base from near the center-of-rotation section of the opposed face of said spin base, The substrate processor characterized by having further the spin base side resistance member which bars the flow of the gas which flows out of the clearance between the periphery edge of the substrate which was formed in the periphery section of said spin base, or its near, and was held at said substrate attachment component, and said spin base.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention holds a substrate and relates to the substrate processor which supplies gases, such as inert gas and a dried air, to the space between the field by the side of the cutoff member of the substrate held at a substrate maintenance means to rotate the held substrate to the circumference of a predetermined shaft, the substrate of a cutoff member, and the opposed face that counters from near the core of the opposed face of a cutoff member.
[0002]
[Description of the Prior Art] This conventional kind of substrate processor is constituted as shown in drawing 11 . The disc-like spin base 102 which has level opposed face 102a which counters Substrate W is connected with the upper limit section of the revolving shaft 101 which transmission connection of the equipment shown in drawing 11 is carried out at the motor which is not illustrated, and rotates to the circumference of Shaft J in one, and three or more substrate attachment components 103 are formed near the periphery section of the spin base 102. A periphery edge is held by three or more places at the substrate attachment component 103, and Substrate W is in the condition which is separated from opposed face 102a of the spin base 102, and it is held by the horizontal position so that it may see from a transverse plane and the inferior surface of tongue by the side of the spin base 102 of Substrate W and opposed face 102a of the spin base 102 may become parallel.
[0003] The disc-like cutoff member 104 which has opposed face 104a which counters above the substrate W held at the substrate attachment component 103 in parallel with the top face (this equipment front face) of Substrate W is arranged. If this cutoff member 104 is constituted free [rise and fall] through the arm 105 and Substrate W is held at the substrate attachment component 103, as the cutoff member 104 descends and it is shown in drawing, contiguity arrangement of the opposed face 104a of the cutoff member 104 will be carried out on the top face of the held substrate W.
[0004] The nozzle 106 which supplies a penetrant remover to the top face of the substrate W held at the substrate attachment component 103 is formed in the core of this cutoff member 104. A penetrant remover is supplied to this nozzle 106 through the penetrant remover supply pipe 107. Moreover, the gas feed hopper 109 which supplies pure gases, such as inert gas and a dried air, to the cutoff member side space 108 between the top face by the side of the cutoff member 104 of the substrate W held at the substrate attachment component 103 and opposed face 104a of the cutoff member 104 is formed in the perimeter of a nozzle 106. A gas is supplied to this gas feed hopper 109 through the gas supply way 110.
[0005] Moreover, the nozzle 111 which supplies a penetrant remover to the inferior surface of tongue by the side of the spin base 102 of the substrate W held at the substrate attachment component 103 (this equipment rear face) is formed in the core of the spin base 102. A penetrant remover is supplied to this nozzle 111 through the penetrant remover supply pipe 112 installed inside by the revolving shaft 101. Furthermore, the gas feed hopper 114 which supplies a gas to the spin base side space 113 between the inferior surfaces of tongue of Substrate W and opposed face 102a of the spin base 102 which were held at the substrate attachment component 103 is formed in the perimeter of a nozzle 111. A gas is supplied to this gas feed hopper 114 through the gas supply way 115 installed inside the penetrant remover supply pipe 112 and the same axle by the revolving shaft 101.
[0006] Washing / desiccation processing by the above-mentioned equipment is performed as follows. First, if Substrate W is held at the substrate attachment component 103, the cutoff member 104 will descend. Next, the substrate W which was made to rotate a revolving shaft 101 and was held is rotated to the circumference of

Shaft J, a penetrant remover is supplied to the top face and inferior surface of tongue of Substrate W from a nozzle 106 and a nozzle 111, and washing to both sides of Substrate W is performed. When a penetrant remover is a drug solution with an etching operation of a hydrofluoric acid etc. at this time, in order to control that the natural oxidation film grows up to be the front face (top face of drawing) of Substrate W, inert gas is supplied to the cutoff member side space 108 from the gas feed hopper 109, the cutoff member side space 108 is permuted and maintained by the inert gas ambient atmosphere, and washing processing is performed.
[0007] After washing processing is completed, while suspending supply of the penetrant remover from nozzles 106 and 111, rotation of Substrate W is continued, and the penetrant remover adhering to Substrate W is shaken off, and it is made to dry. In order to promote desiccation of the top face of Substrate W, and an inferior surface of tongue in the case of this desiccation, while supplying a gas to the cutoff member side space 108 from the gas feed hopper 109, he is trying to supply a gas to the spin base side space 113 from the gas feed hopper 114.
[0008]
[Problem(s) to be Solved by the Invention] However, in the case of the conventional example which has such a configuration, there are the following problems. In equipment, conventionally the gas supplied to the cutoff member side space 108 from the gas feed hopper 109, rotating the spin base 102 and Substrate W It flows in the direction of a periphery edge from the core of the field by the side of the cutoff member 104 of the substrate W held at the substrate attachment component 103. It will flow out of the clearance 120 between the periphery edges of Substrate W and the cutoff members 104 which were held at the substrate attachment component 103 (this clearance is also hereafter called "cutoff member side clearance") outside. In order to permute and maintain the cutoff member side space 108 at an inert gas ambient atmosphere, to fill the gas in the cutoff member side space 108 and to promote desiccation of the field by the side of the cutoff member 104 of Substrate W, a gas needs to be filled in the cutoff member side space 108 so that a gas may touch all over the field of Substrate W. Therefore, conventionally, with the configuration of equipment, carrying out sequential supply of the new gas had to be continued from the gas feed hopper 109 so that the gas which flows out of the cutoff member side clearance 120 may be compensated, and the amount of the gas used supplied to the cutoff member side space 108 had increased.
[0009] Moreover, conventionally which is shown in drawing 11 , in equipment, an external ambient atmosphere may flow into the cutoff member side space 108 from the cutoff member side clearance 120, and the field by the side of the cutoff member 104 of Substrate W might be polluted.
[0010] Above-mentioned un-arranging may happen to the spin base 102 side similarly. Namely, for promotion of desiccation of the field by the side of the spin base 102 of Substrate W etc. If a gas is supplied to the spin base side space 113 from the gas feed hopper 114, rotating the spin base 102 and Substrate W Since it flows out of the clearance 130 between the periphery edges of Substrate W and the spin bases 102 which were held at the substrate attachment component 3 (this clearance is also hereafter called "spin base side clearance") outside Carrying out sequential supply of the new gas had to be continued from the gas feed hopper 114 so that the gas which flows out of the spin base side clearance 130 may be compensated, and the amount of the gas used supplied to the spin base side space 113 had increased.
[0011] Moreover, an external ambient atmosphere may flow into the spin base side space 113 from the spin base side clearance 130, and the field by the side of the spin base 102 of Substrate W might be polluted.
[0012] while reducing the amount of the gas used which this invention is made in view of such a situation, and is supplied to cutoff member side space -- contamination of the field by the side of the cutoff member of a substrate -- mitigating -- further -- it -- in addition, while reducing the amount of the gas used supplied to spin base side space, it aims at offering the substrate processor which can also mitigate contamination of the field by the side of the spin base of a substrate.
[0013]
[Means for Solving the Problem] This invention takes the following configurations, in order to attain such a purpose. Namely, a substrate maintenance means for invention according to claim 1 to hold a substrate, and to rotate the held substrate to the circumference of a predetermined shaft, The substrate held at said substrate maintenance means, and the cutoff member which has the opposed face which counters, A cutoff member side gas supply means to supply a gas to the space between the field by the side of the cutoff member of the substrate held at said substrate maintenance means, and the opposed face of said cutoff member from near the core of the opposed face of said cutoff member, Spacing of the clearance between the periphery edge of the substrate held at the preparation and said substrate maintenance means, and said cutoff member It is characterized by constituting so that it may be made narrower than spacing of near the center section of the

field by the side of said cutoff member of the substrate held at said substrate maintenance means, and the opposed face of said cutoff member which counters the part.
[0014] Moreover, a substrate maintenance means for invention according to claim 2 to hold a substrate, and to rotate the held substrate to the circumference of a predetermined shaft, The substrate held at said substrate maintenance means, and the cutoff member which has the opposed face which counters, A cutoff member side gas supply means to supply a gas to the space between the field by the side of the cutoff member of the substrate held at said substrate maintenance means, and the opposed face of said cutoff member from near the core of the opposed face of said cutoff member, It is prepared in the periphery section of said cutoff member, or its near, and is characterized by having the cutoff member side resistance member which bars the flow of the gas which flows out of the clearance between the periphery edge of the substrate held at said substrate maintenance means, and said cutoff member.
[0015] Moreover, invention according to claim 3 is set to a substrate processor given in above-mentioned claims 1 or 2. The spin base which rotates said substrate maintenance means to the circumference of a predetermined shaft, and has a substrate and the opposed face which counters, The substrate attachment component which separates from the opposed face of said spin base, and holds a substrate, To the space between the field by the side of the spin base of the substrate which carried out preparation ****** and was held at said substrate attachment component, and the opposed face of said spin base It has further a spin base side gas supply means to supply a gas from near the center-of-rotation section of the opposed face of said spin base. Spacing of the clearance between the periphery edge of the substrate held at said substrate attachment component, and said spin base It is characterized by constituting so that it may be made narrower than spacing of near the center section of the field by the side of said spin base of the substrate held at said substrate attachment component, and the opposed face of said spin base which counters the part.
[0016] Moreover, invention according to claim 4 is set to a substrate processor given in above-mentioned claims 1 or 2. The spin base which rotates said substrate maintenance means to the circumference of a predetermined shaft, and has a substrate and the opposed face which counters, The substrate attachment component which separates from the opposed face of said spin base, and holds a substrate, A spin base side gas supply means to supply a gas to the space between the field by the side of the spin base of the substrate which carried out preparation ****** and was held at said substrate attachment component, and the opposed face of said spin base from near the center-of-rotation section of the opposed face of said spin base, It is prepared in the periphery section of said spin base, or its near, and is characterized by having further the spin base side resistance member which bars the flow of the gas which flows out of the clearance between the periphery edge of the substrate held at said substrate attachment component, and said spin base.
[0017]
[Function] The operation of invention according to claim 1 is as follows. While a substrate is held at a substrate maintenance means and a substrate rotates to the circumference of a predetermined shaft, with a cutoff member side gas supply means If a gas is supplied to the space between the field by the side of the cutoff member of the substrate held at the substrate maintenance means, and the opposed face of a cutoff member from near the core of the opposed face of a cutoff member, a gas will flow to a periphery edge from the core of the field by the side of the cutoff member of the substrate held at the substrate maintenance means.
[0018] The clearance between the periphery edges of a substrate and cutoff members which were held in this invention according to claim 1 at the substrate maintenance means Spacing with the opposed face of the cutoff member to which spacing of (this clearance is also hereafter called "cutoff member side clearance") counters near a center section and the part of the field by the side of the cutoff member of the substrate held at the substrate maintenance means Since it constitutes so that it may become narrower than (this spacing is also hereafter called "cutoff member side center-section spacing") The gas which flows to a periphery edge from the core of the field by the side of the cutoff member of the substrate with which spacing of a cutoff member side clearance and cutoff member side center-section spacing were held at the substrate maintenance means compared with equipment conventionally [same] stops easily being able to flow out of a cutoff member side clearance, and the flow of the gas from said cutoff member side clearance decreases. Therefore, in order to fill the gas to the above-mentioned space, the amount of supply of the gas which newly continues carrying out sequential supply from a cutoff member side gas supply means becomes less than equipment conventionally.
[0019] Moreover, since spacing of a cutoff member side clearance is narrower than cutoff member side center-section spacing, compared with equipment, an external ambient atmosphere stops easily being able to flow into the above-mentioned space from a cutoff member side clearance conventionally [with same spacing of a cutoff

member side clearance and cutoff member side center-section spacing].
[0020] The operation of invention according to claim 2 is as follows. While the substrate held at the substrate maintenance means rotates to the circumference of a predetermined shaft, namely, with a cutoff member side gas supply means Although the gas supplied to the space between the field by the side of the cutoff member of the substrate held at the substrate maintenance means and the opposed face of a cutoff member from near the core of the opposed face of a cutoff member tends to flow to a periphery edge from the core of the field by the side of the cutoff member of the substrate held at the substrate maintenance means and it is going to flow out of a cutoff member side clearance The flow of this gas is barred by the cutoff member side resistance member prepared in the periphery section of a cutoff member, or its near. Therefore, since a gas stops easily being able to flow out of a cutoff member side clearance and the flow of the gas from a cutoff member side clearance becomes less than equipment conventionally, in order to fill the gas to the above-mentioned space, the amount of supply of the gas which newly continues carrying out sequential supply from a cutoff member side gas supply means becomes less than equipment conventionally.
[0021] Moreover, since the cutoff member side resistance member is prepared in the periphery section of a cutoff member, or its near, the external ambient atmosphere which is going to flow into the above-mentioned space from a cutoff member side clearance is obstructed by the cutoff member side resistance member. Therefore, compared with equipment, an external ambient atmosphere stops being able to flow into the above-mentioned space easily conventionally.
[0022] In addition, a cutoff member side resistance member may be constituted in a cutoff member and one by turning up the periphery section of for example, a cutoff member to the periphery edge side of the substrate held at the substrate maintenance means etc., and may consist of a cutoff member and an another member.
[0023] In invention given in claims 3 and 4, the amount of the gas used supplied to the space between invention given in above-mentioned claims 1 and 2, the field by the side of the spin base of the substrate held according to the same operation at the substrate maintenance means, and the opposed face of the spin base decreases.
[0024] That is, in invention according to claim 3, a substrate is held at the substrate attachment component which constitutes a substrate maintenance means, and while the spin base rotates to the circumference of a predetermined shaft and the spin base and a substrate rotate to the circumference of the shaft, a gas is supplied to the above-mentioned space from near the center-of-rotation section of the opposed face of the spin base by the spin base side gas supply means.
[0025] The clearance between the periphery edges of a substrate and the spin bases which were held in this invention according to claim 3 at the substrate attachment component Spacing with the opposed face of the spin base where spacing of (this clearance is also hereafter called "spin base side clearance") counters near a center section and the part of the field by the side of the spin base of the substrate held at the substrate attachment component Since it constitutes so that it may become narrower than (this spacing is also hereafter called "spin base side center-section spacing") Spacing of a spin base side clearance and spin base side center-section spacing compare with equipment conventionally [same]. The gas which flows to a periphery edge from the core of the field by the side of the spin base of the substrate held at the substrate attachment component stops easily being able to flow out of a spin base side clearance, and the flow of the gas from a spin base side clearance decreases. Therefore, in order to fill the gas to the above-mentioned space, the amount of supply of the gas which newly continues carrying out sequential supply from a spin base side gas supply means becomes less than equipment conventionally.
[0026] Moreover, since spacing of a spin base side clearance is narrower than spin base side center-section spacing, compared with equipment, an external ambient atmosphere stops easily being able to flow into the above-mentioned space from a spin base side clearance conventionally [with same spacing of a spin base side clearance and spin base side center-section spacing].
[0027] While the substrate and the spin base which were held at the substrate attachment component rotate to the circumference of a predetermined shaft in invention according to claim 4, with a spin base side gas supply means Although the gas supplied to the above-mentioned space from near the center-of-rotation section of the opposed face of the spin base tends to flow to a periphery edge from the core of the field by the side of the spin base of the substrate held at the substrate attachment component and it is going to flow out of a spin base side clearance The flow of this gas is barred by the spin base side resistance member prepared in the periphery section of the spin base, or its near. Therefore, since a gas stops easily being able to flow out of a spin base side clearance and the flow of the gas from a spin base side clearance becomes less than equipment conventionally, in order to fill the gas to the above-mentioned space, the amount of supply of the gas which newly continues

carrying out sequential supply from a spin base side gas supply means becomes less than equipment conventionally.

[0028] Moreover, since the spin base side resistance member is prepared in the periphery section of the spin base, or its near, the external ambient atmosphere which is going to flow into the above-mentioned space from a spin base side clearance is obstructed by the spin base side resistance member. Therefore, compared with equipment, an external ambient atmosphere stops being able to flow into the above-mentioned space easily conventionally.

[0029] In addition, a spin base side resistance member may be constituted in the spin base and one by turning up the periphery section of for example, the spin base to the periphery edge side of the substrate held at the substrate attachment component etc., and may consist of the spin base and an another member.

[0030] Moreover, you may constitute from a member with separate cutoff member side resistance member prepared in the periphery section of the cutoff member of invention according to claim 2, or its near and spin base side resistance member prepared in the periphery section of the spin base of invention according to claim 4, or its near, and may constitute from same member.

[0031]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Drawing 1 is drawing of longitudinal section showing the configuration of the substrate processor concerning the 1st example of this invention.

[0032] The spin base 1 is connected with the upper limit section of the revolving shaft 2 which transmission connection is carried out at the motor which is not illustrated, and rotates to the circumference of Shaft J in one, and is constituted pivotable at the circumference of Shaft J. Three or more substrate attachment components 3 for holding the periphery edge of Substrate W by three or more places are formed in this spin base 1.

[0033] A periphery edge is held by three or more places at these substrates attachment component 3, and Substrate W is held by the horizontal position in the condition of having separated from the spin base 1.

[0034] The spin base 1 is equipped with clinch section 1b by which the perimeter (periphery section of the spin base 1) of horizontal level 1a which has the horizontal plane which counters Substrate W, and horizontal level 1a was turned up at the periphery edge side of the substrate W held at the substrate attachment component 3. By return [a / this / horizontal level 1], section 1b may be constituted from a member of one, and it may consist of another members so that section 1b may be attached in the perimeter of disc-like horizontal level 1a by return.

[0035] Moreover, the clearance between the periphery edges of Substrate W and the spin bases 1 which were held at the substrate attachment component 3 (This clearance is also hereafter called "spin base side clearance") The spacing d1 of 4 Near the center section of the inferior surface of tongue by the side of the spin base 1 of the substrate W held at the substrate attachment component 3 narrower ($d1<d2$) than the spacing (this spacing is also hereafter called "spin base side center-section spacing") d2 of (for example, a core) and the opposed face (this example horizontal plane of horizontal level 1a) of the spin base 1 which counters that part — said clinch section 1b is constituted like.

[0036] The nozzle 5 which supplies a penetrant remover to the inferior surface of tongue by the side of the spin base 1 of the substrate W held at the substrate attachment component 3 (it usually becomes a rear face with the equipment which holds Substrate W like this example equipment in the upper part of the spin base 1) is formed in the core of the spin base 1. A penetrant remover is supplied to this nozzle 5 from the penetrant remover feed zone 8 through the penetrant remover supply pipe 6, tubing 7, etc. which were installed inside by the revolving shaft 2.

[0037] Moreover, the gas feed hopper 10 which supplies gases, such as inert gas (nitrogen gas etc.) and a dried air, to the spin base side space 9 between the inferior surface of tongue by the side of the spin base 1 of the substrate W held at the substrate attachment component 3 and the opposed face of the spin base 1 is formed in the perimeter of a nozzle 5. A gas is supplied to this gas feed hopper 10 from the gas feed zone 13 through the penetrant remover supply pipe 6, the gas supply way 11, tubing 12 which were installed inside the same axle by the revolving shaft 2, etc.

[0038] The cutoff member 20 is formed above the substrate W held at the substrate attachment component 3. This cutoff member 20 is connected with the arm 21, and it is constituted possible [rise and fall] so that it may attach and detach to the substrate W with which the cutoff member 20 was held by the elevator style which is not illustrated through this arm 21 at the substrate attachment component 3.

[0039] Opposed face 20a of the cutoff member 20 which counters the top face by the side of the cutoff member

20 of the substrate W held at the substrate attachment component 3 (it usually becomes a front face with the equipment which holds Substrate W like this example equipment in the upper part of the spin base 1) is constituted in the shape of [which saw and curved from the top face of the substrate W held at the substrate attachment component 3] a concave surface. The clearance between the periphery edges of Substrate W and opposed face 20a of the cutoff member 20 which were held by this at the substrate attachment component 3 (This clearance is also hereafter called "cutoff member side clearance") The spacing d3 of 22 narrower (d3<d4) than the spacing (this spacing is also hereafter called "cutoff member side center-section spacing") d4 of near the center section of the top face of the substrate W held at the substrate attachment component 3 (for example, core), and opposed face 20a of the cutoff member 20 which counters that part — it constitutes like.

[0040] The nozzle 23 which supplies a penetrant remover to the top face of the substrate W held at the substrate attachment component 3 is formed in the core of the cutoff member 20. A penetrant remover is supplied to this nozzle 23 from the penetrant remover feed zone 26 through the penetrant remover supply pipe 24, tubing 25, etc. which were installed inside by the arm 21.

[0041] Moreover, the gas feed hopper 28 which supplies gases, such as inert gas and a dried air, to the cutoff member side space 27 between the top face by the side of the cutoff member 20 of the substrate W held at the substrate attachment component 3 and opposed face 20a of the cutoff member 20 is formed in the perimeter of a nozzle 23. A gas is supplied to this gas feed hopper 28 from the gas feed zone 31 through the penetrant remover supply pipe 24, the gas supply way 29, tubing 30 which were installed inside the same axle by the arm 21, etc.

[0042] Washing / desiccation processing by the above-mentioned 1st example equipment is performed as follows. First, if Substrate W is held at the substrate attachment component 3, the cutoff member 20 will descend, and as shown in drawing 1 , contiguity arrangement of the cutoff member 20 will be carried out at the substrate W held at the substrate attachment component 3.

[0043] Next, the substrate W which was made to rotate a revolving shaft 2 and was held is rotated to the circumference of Shaft J with the spin base 1, a penetrant remover is supplied to the top face and inferior surface of tongue of Substrate W from a nozzle 5 and a nozzle 23, and washing to both sides of Substrate W is performed. In being the drug solution with which a penetrant remover has an etching operation of a hydrofluoric acid etc. at this time, in order to control that the natural oxidation film grows up to be the front face (top face of drawing) of Substrate W, inert gas is supplied to the cutoff member side space 27 from the gas feed hopper 28, the cutoff member side space 27 is permuted and maintained by the inert gas ambient atmosphere, and washing processing is performed.

[0044] After washing processing is completed, while suspending supply of the penetrant remover from nozzles 5 and 23, rotation of Substrate W is continued, and the penetrant remover adhering to Substrate W is shaken off, and it is made to dry. In order to promote desiccation of the top face of Substrate W, and an inferior surface of tongue in the case of this desiccation, while supplying a gas to the cutoff member side space 27 from the gas feed hopper 28, a gas is supplied to the spin base side space 9 from the gas feed hopper 10.

[0045] When a gas is supplied to the spin base side space 9 for promotion of desiccation of the inferior surface of tongue (rear face) of Substrate W etc., now, with this 1st example equipment Since the spacing d1 of the spin base side clearance 4 is constituted so that it may be made narrower than the spin base side center-section spacing d2 as shown in drawing 1 As shown in drawing 1111 , it compares with equipment conventionally the spacing d11 of the spin base side clearance 130 and whose spin base side center-section spacing d12 are the same (d11=d12). The gas which flowed to the periphery edge from the core of the field by the side of the spin base 1 of the substrate W held at the substrate attachment component 3 stops easily being able to flow out of the spin base side clearance 4, and the flow of the gas from the spin base side clearance 4 decreases.

[0046] Moreover, since the flow of the gas which is going to flow out of the spin base side clearance 4 is barred by the medial surface (field by the side of the spin base side space 9) of clinch section 1b of the periphery section of the spin base 1, also by that, a gas stops further easily being able to flow out of the spin base side clearance 4, and the flow of the gas from the spin base side clearance 4 becomes less than equipment conventionally.

[0047] Therefore, in order to fill the gas to the spin base side space 9, the amount of supply of the gas which newly continues carrying out sequential supply from the gas feed hopper 10 can be made conventionally fewer than equipment, and the amount of the gas used supplied to the spin base side space 9 can be reduced.

[0048] Moreover, since the spacing d1 of the spin base side clearance 4 is narrower than the spin base side center-section spacing d2, compared with equipment, an external ambient atmosphere stops easily being able to

flow into the spin base side space 9 from the spin base side clearance 4 conventionally [with same spacing d11 of the spin base side clearance 130 and spin base side center-section spacing d12].
[0049] Furthermore, since the external ambient atmosphere which is going to flow into the spin base side space 9 also becomes obstructed by clinch section 1b of the periphery section of the spin base 1 from the spin base side clearance 4, compared with equipment, an external ambient atmosphere stops easily being able to flow into the spin base side space 9 also due to that conventionally.
[0050] Therefore, contamination of the inferior surface of tongue by the side of the spin base 1 of Substrate W is conventionally mitigable from equipment.
[0051] In addition, to the spin base side center-section spacing d2 being 10mm, when spacing d1 of the spin base side clearance 4 was set to 1mm, that high effectiveness was acquired has checked experimentally.
[0052] Moreover, since it constitutes from the 1st example of the above so that spacing d3 of the cutoff member side clearance 22 may be made narrower than the cutoff member side center-section spacing d4 as shown in drawing 1 For control of growth of the natural oxidation film of the top face (front face) of Substrate W, promotion of desiccation, etc. As well as the relation between Substrate W and the spin base 1 when supplying a gas to the cutoff member side space 27 The spacing d13 of the cutoff member side clearance 22 and the cutoff member side center-section spacing d14 compare with equipment (refer to drawing 11) conventionally [same]. The gas which flowed to the periphery edge from the core of the field by the side of the cutoff member 20 of the substrate W held at the substrate attachment component 3 stops easily being able to flow out of the cutoff member side clearance 22. The flow of the gas from the cutoff member side clearance 22 can decrease, in order to fill the gas to the cutoff member side space 27, the amount of supply of the gas which newly continues carrying out sequential supply from the gas feed hopper 28 can be made conventionally fewer than equipment, and the amount of the gas used supplied to the cutoff member side space 27 can be reduced.
[0053] Moreover, since the spacing d3 of the cutoff member side clearance 22 is narrower than the cutoff member side center-section spacing d4, an external ambient atmosphere stops easily being able to flow into the cutoff member side space 27 from the cutoff member side clearance 22, and contamination of the top face by the side of the cutoff member 20 of Substrate W can be conventionally mitigated from equipment.
[0054] Next, some modifications for making spacing d1 of the spin base side clearance 4 narrower than the spin base side center-section spacing d2 are introduced.
[0055] You may make it turn up clinch section 1b of the spin base 1 from the location by the side of the core of the spin base 1 from the apparent vertical VL passing through the periphery edge of the substrate W held at the substrate attachment component 3, as shown in drawing 2 (a).
[0056] Moreover, 90 degrees or more of the clinch include angle of clinch section 1b of the spin base 1 are sufficient like the 1st example of the above, and as shown in drawing 2 (b) and (c), it may be constituted so that the clinch include angle theta of clinch section 1b of said spin base 1 may become about 90 degrees or 90 degrees or less.
[0057] Furthermore, as shown in drawing 2 (d), upper limit 1c of the periphery section (periphery section of clinch section 1b) of the spin base 1 may constitute so that it may consist of a horizontal plane HP including the inferior surface of tongue of the substrate W held at the substrate attachment component 3 caudad, and it may constitute so that it may become the upper part to the same extent or a little.
[0058] Moreover, as shown in drawing 3 (a) and (b), 1d of opposed faces of the spin base 1 which counters the inferior surface of tongue of the substrate W held at the substrate attachment component 3 may be constituted like opposed face 20a of the cutoff member 20 in the shape of [which saw and curved from the inferior surface of tongue of Substrate W] a concave surface. In addition, in drawing 3 (a), it is what constituted the spin base 1 from a dished member, and drawing 3 (b) prepares a crevice so that 1d of opposed faces of the above-mentioned configuration may be formed in the cylinder-like spin base 1.
[0059] Moreover, although 1d of opposed faces of the spin base 1 was incurvated, as shown in drawing 3 (c) and (d), a part for the bend may consist of drawing 3 (a) and (b) in a straight-line-like inclined plane.
[0060] In addition, as shown in drawing 4 , when you prepare heights 1e near the core of the spin base 1 and the nozzle 5 and the gas feed hopper 10 are provided in this heights 1e, let spin base side center-section spacing d2 be spacing around that heights 1e.
[0061] Moreover, in order to make spacing d1 of the spin base side clearance 4 narrower than the spin base side center-section spacing d2, it cannot be overemphasized that the configuration of those other than the 1st example of the above or its modification is also realizable.
[0062] Next, some modifications for making spacing d3 of the cutoff member side clearance 22 narrower than

the cutoff member side center-section spacing d4 are introduced.
[0063] Although the cutoff member 20 was constituted from a dished member, as shown in drawing 5 (a), a crevice may prepare and consist of the 1st example of the above so that opposed face 20a of the shape of a concave surface which curved to the cylinder-like cutoff member 20 may be formed.
[0064] Moreover, a part for the bend of opposed face 20a of the cutoff member 20 of the 1st example of the above or the cutoff member 20 of the modification of drawing 5 R> 5 (a) may consist of straight-line-like inclined planes, as shown in drawing 5 (b) and (c).
[0065] Furthermore, as shown in drawing 5 (d), section 20c may be had and constituted by return [member / 20 / cutoff / b / horizontal level 20] like the spin base 1 of the 1st example of the above. In addition, about clinch section 20c of the cutoff member 20 constituted in this way, deformation implementation may be carried out like the modification stated by drawing 2 about clinch section 1b of the spin base 1.
[0066] Moreover, in order to make spacing d3 of the cutoff member side clearance 22 narrower than the cutoff member side center-section spacing d4, it cannot be overemphasized that the configuration of those other than the 1st example of the above or its modification is also realizable.
[0067] A substrate processor may be constituted combining suitably the 1st example of the above or drawing 2 , the spin base 1 of the arbitration of each modification of drawing 3 , and the cutoff member 20 of the arbitration of the 1st example of the above, or each modification of drawing 5 R> 5.
[0068] Next, the configuration of the 2nd example equipment of this invention is explained with reference to drawing 6 R> 6. This 2nd example equipment is characterized by to form the resistance member 40 which bars the flow of the gas into which the gas supplied to the cutoff member side space 27 flows out of the cutoff member side clearance 22 near the periphery section of the cutoff member 20 near the periphery section of the spin base 1 while the gas supplied to the spin base side space 9 bars the flow of the gas which flows out of the spin base side clearance 4.
[0069] This resistance member 40 consists of ring-like members, and is constituted free [rise and fall] to the spin base 1 by the elevator style which is not illustrated. In addition, you may constitute so that rise and fall of the resistance member 40 may carry out independently with the cutoff member 20, the resistance member 40 may be connected with the cutoff member 20, and you may constitute so that you may make it go up and down with the cutoff member 20. In addition, the part which is common in the 1st example attaches the same sign as drawing 1 , and the detailed explanation is omitted.
[0070] Since the flow of the gas which is supplied to the spin base side space 9, flows to a periphery edge from the core of the field by the side of the spin base 1 of the substrate W held at the substrate attachment component 3, and flows out of the spin base side clearance 4 by having formed such a resistance member 40 is barred by this resistance member 40, a gas stops easily being able to flow out of the spin base side clearance 4. Therefore, the amount of the gas used which the amount of supply of the gas which newly [in order for the flow of the gas from the spin base side clearance 4 to become less than equipment conventionally even if it is making the spin base 1 the conventionally same configuration as equipment (refer to drawing 11), as shown in drawing 6 , and to fill the gas to the spin base side space 9] from the gas feed hopper 10 continues carrying out sequential supply can be made conventionally fewer than equipment, and is supplied to the spin base side space 9 can reduce.
[0071] Moreover, since the external ambient atmosphere which is going to flow into the spin base side space 9 from the spin base side clearance 4 is obstructed by the resistance member 40, compared with equipment, an external ambient atmosphere stops easily being able to flow into the spin base side space 9, and it can mitigate contamination of the inferior surface of tongue by the side of the spin base 1 of Substrate W from equipment conventionally.
[0072] Moreover, the cutoff member side space 27 is supplied and it flows to a periphery edge from the core of the field by the side of the cutoff member 20 of the substrate W held at the substrate attachment component 3, and since the flow of the gas which flows out of the cutoff member side clearance 22 is also barred by the resistance member 40, a gas stops easily being able to flow out of the cutoff member side clearance 22. Therefore, the amount of the gas used which the amount of supply of the gas which newly [in order for the flow of the gas from the cutoff member side clearance 22 to become less than equipment conventionally even if it is making the cutoff member 20 the conventionally same configuration as equipment (refer to drawing 11), as shown in drawing 6 , and to fill the gas to the cutoff member side space 27] from the gas feed hopper 28 continues carrying out sequential supply can be made conventionally fewer than equipment, and supplies to the cutoff member side space 27 can reduce.

[0073] Moreover, since the external ambient atmosphere which is going to flow into the cutoff member side space 27 from the cutoff member side clearance 22 is obstructed by the resistance member 40, compared with equipment, an external ambient atmosphere stops easily being able to flow into the cutoff member side space 27, and it can mitigate contamination of the top face by the side of the cutoff member 20 of Substrate W from equipment conventionally.
[0074] In addition, the spin base side resistance member which bars the flow of the gas into which the gas supplied to the spin base side space 9 flows out of the spin base side clearance 4 with the above-mentioned 2nd example equipment, Although the gas supplied to the cutoff member side space 27 constitutes the cutoff member side resistance member which bars the flow of the gas which flows out of the cutoff member side clearance 22 from a member 40 of one Spin base side resistance member 40a of the shape of a ring which bars the flow of the gas into which the gas separately supplied to the spin base side space 9 flows these members out of the spin base side clearance 4 as shown in drawing 7 , You may divide and prepare in cutoff member side resistance member 40b of the shape of a ring which bars the flow of the gas into which the gas supplied to the cutoff member side space 27 flows out of the cutoff member side clearance 22.
[0075] Moreover, spin base side resistance member 40a may be prepared in the periphery section of the spin base 1 like clinch section 1b of the spin base 1 of the 1st example equipment, or the spin base 1 of the modification of drawing 2 . Cutoff member side resistance member 40b may be similarly prepared in the periphery section of the cutoff member 20.
[0076] In the 2nd example of the above, or its modification, although the resistance member is constituted from a ring-like member, a resistance member may consist of other configurations and a configuration.
[0077] Moreover, since effectiveness, such as reduction of the amount of supply of the gas to the spin base side space 9 or the cutoff member side space 27 and mitigation of contamination of both sides of Substrate W, is acquired by having formed the resistance member 40 As shown in drawing 6 , the spin base 1 and the cutoff member 20 are the same configuration (spin base side center-section spacing is the same as spacing of a spin base side clearance) as equipment conventionally. Even if cutoff member side center-section spacing is the same as spacing of a cutoff member side clearance, it is good, but while, constituting the spin base 1 or/and the cutoff member 20 like the 1st example equipment or its modification for example, you may constitute so that the resistance member 40 may be formed. Thus, if constituted, still higher effectiveness can be acquired.
[0078] Next, the configuration of the 3rd example equipment of this invention is explained with reference to drawing 8 R> 8. This 3rd example equipment is characterized by constituting so that Substrate W may be held in the lower part of the spin base 1. The substrate attachment component 50 of this equipment is constituted free [closing motion], as the arrow head of drawing shows, and it holds Substrate W so that the periphery edge of Substrate W may be pinched by three or more places. The equipment of such a configuration usually uses the front face of Substrate W as the top face by the side of the spin base 1, and is processed. other configurations — the 1st example of the above, and abbreviation — since it is the same, a common part attaches the same sign as drawing 1 , and omits the detailed explanation.
[0079] Even if it is equipment of such a configuration, the same effectiveness as the 1st example equipment can be acquired. Moreover, each modification explaining the 1st example equipment is applicable also like this 3rd example equipment.
[0080] The 4th example equipment shown in drawing 9 forms the resistance member 40 in the equipment constituted so that Substrate W might be held in the lower part of the spin base 1 like the above-mentioned 3rd example equipment like the above-mentioned 2nd example equipment.
[0081] Also with this 4th example equipment, the same effectiveness as the 2nd example equipment can be acquired. Moreover, each modification explaining the 2nd example equipment is applicable also like this 4th example equipment.
[0082] In addition, although each above-mentioned example took and explained the equipment which carries out washing processing to both sides of a substrate to the example For example, invention of a publication is applicable to claims 1 and 2 similarly to the equipment (equipment which is not equipped with a nozzle 5, the gas feed hopper 10, etc.) which does not perform processing to the rear face by the side of the inferior surface of tongue of a substrate in the 1st and 2nd example. Reduction of the amount of supply of the gas to the cutoff member side space 27 and reduction of contamination of the field by the side of the cutoff member 20 of Substrate W can be aimed at.
[0083] Moreover, the substrate maintenance means of the equipment which is equipped with a cutoff member and processes a substrate front face with the equipment which processes only the front face of a substrate has

not only the configuration of the 1st and 2nd example but the thing of a configuration as shown in drawing 1010 , and invention of a publication can be similarly applied to claims 1 and 2 to such equipment.
[0084] The substrate maintenance means of drawing 10 (a) is the configuration of the vacuum adsorption hole which is not illustrated on the top face of the spin base 60 being prepared, and carrying out vacuum adsorption and holding the rear face of Substrate W on the top face of the spin base 60. Moreover, although the substrate maintenance means of drawing 10 (b) is the same as that of the thing of the 1st and 2nd example, and abbreviation, not disc-like but the arm 70 which equipped the point with the substrate attachment component 3 is formed in a radial, and the spin base 1 constitutes it.
[0085]
[Effect of the Invention] According to invention according to claim 1, spacing of the clearance between the periphery edges of a substrate and cutoff members which were held at the substrate maintenance means (cutoff member side clearance) so that clearly from the above explanation Since it constituted so that it might be made narrower than spacing (cutoff member side center-section spacing) of near the center section of the field by the side of the cutoff member of the substrate held at the substrate maintenance means, and the opposed face of the cutoff member which counters the part Compared with equipment, the flow of the gas from a cutoff member side clearance becomes less than equipment conventionally conventionally [with same spacing of a cutoff member side clearance and cutoff member side center-section spacing]. Therefore, in order to fill the gas to the space between the field by the side of the cutoff member of the substrate held at the substrate maintenance means, and the opposed face of a cutoff member, the amount of supply of the gas which newly continues carrying out sequential supply from a cutoff member side gas supply means can be made conventionally fewer than equipment, and the amount of the gas used supplied to the above-mentioned space can be reduced.
[0086] Moreover, since spacing of a cutoff member side clearance is narrower than cutoff member side center-section spacing, conventionally [with same spacing of a cutoff member side clearance and cutoff member side center-section spacing], compared with equipment, an external ambient atmosphere stops being able to flow into the above-mentioned space easily from a cutoff member side clearance, and contamination of the field by the side of the cutoff member of a substrate can be conventionally mitigated from equipment.
[0087] Since the cutoff member side resistance member which bars the flow of the gas into which the gas supplied to the above-mentioned space flows out of a cutoff member side clearance was prepared in the periphery section of a cutoff member, or its near according to invention according to claim 2, the flow of the gas which flows out of a cutoff member side clearance becomes less than equipment conventionally. Therefore, in order to fill the gas to the above-mentioned space, the amount of supply of the gas which newly continues carrying out sequential supply from a cutoff member side gas supply means can be made conventionally fewer than equipment, and the amount of the gas used supplied to the above-mentioned space can be reduced.
[0088] Moreover, since the cutoff member side resistance member is prepared in the periphery section of a cutoff member, or its near, it is obstructed by the cutoff member side resistance member, an external ambient atmosphere stops being able to flow into the above-mentioned space easily compared with equipment conventionally, and the external ambient atmosphere which is going to flow into cutoff member side space from a cutoff member side clearance can mitigate contamination of the field by the side of the cutoff member of a substrate from equipment conventionally.
[0089] While reducing the amount of the gas used which is further supplied to the space by the side of the spin base in addition to mitigating contamination of the field by the side of the cutoff member of a substrate while reducing the amount of the gas used supplied to the space by the side of a cutoff member according to invention given in claims 3 and 4, contamination of the field by the side of the spin base of a substrate is also mitigable.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing of longitudinal section showing the configuration of the substrate processor concerning the 1st example of this invention.
[Drawing 2] It is the fragmentary sectional view showing the configuration of the modification for making spacing of a spin base side clearance narrower than spin base side center-section spacing.
[Drawing 3] It is drawing of longitudinal section showing the configuration of the modification of others for making spacing of a spin base side clearance narrower than spin base side center-section spacing.
[Drawing 4] It is drawing showing spin base side center-section spacing in case heights are formed in the core of the spin base.
[Drawing 5] It is drawing of longitudinal section showing the configuration of the modification for making spacing of a cutoff member side clearance narrower than cutoff member side center-section spacing.
[Drawing 6] It is drawing of longitudinal section showing the configuration of the 2nd example equipment of this invention.
[Drawing 7] It is drawing of longitudinal section showing the configuration of the modification of the 2nd example equipment.
[Drawing 8] It is drawing of longitudinal section showing the configuration of the 3rd example equipment of this invention.
[Drawing 9] It is drawing of longitudinal section showing the configuration of the 4th example equipment of this invention.
[Drawing 10] It is drawing showing the configuration of the modification of a substrate maintenance means applicable to invention given in claims 1 and 2.
[Drawing 11] It is drawing of longitudinal section showing the configuration of equipment conventionally.
[Description of Notations]
1 Spin Base
2 Revolving Shaft
3 Substrate Attachment Component
4 Spin Base Side Clearance
9 Spin Base Side Space
10 Gas Feed Hopper by the side of Spin Base
20 Cutoff Member
20a The opposed face of a cutoff member
22 Cutoff Member Side Clearance
27 Cutoff Member Side Space
28 Gas Feed Hopper by the side of Cutoff Member
40 Resistance Member
40a Spin base side resistance member
40b Cutoff member side resistance member
W Substrate
J The predetermined shaft made to rotate a substrate
d1 Spacing of a spin base side clearance
d2 Spin base side center-section spacing
d3 Spacing of a cutoff member side clearance

d4 Cutoff member side center-section spacing

[Translation done.]